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FEDERAL GEOGRAPHIC DATA COMMITTEE

Geospatial Excellence and Innovation Update

National Geospatial Advisory Committee Meeting
December 6, 2022

Geospatial Excellence and Innovation Subcommittee

Membership:

- Vasit Sagan (Chair), Siva Ravada (Vice-Chair), Clio Andris, Byron Bluehorse, Jack Dangermond, Bill Haneberg, Tony LaVoi, Kathleen Stewart

Subcommittee Role:

The subcommittee will assess and identify approaches and opportunities for the U.S. geospatial community to enhance key geospatial capabilities and initiatives. These may include:

- Datum modernization
- Geodesy and other basic geospatial science capabilities
- **UNGGIM Integrated Geospatial Information Framework (IGIF)**
- Emerging technologies (AI/ML, 3D AR/VR, Big Data)
- Risks to U.S. geospatial competitiveness
- The feasibility and need for creating a national center for geospatial sciences
- A dedicated, federal funding program to support geospatial R&D

Geospatial Excellence and Innovation – Timeline/Next Steps

- Determine subcommittee topic(s) of focus for 2023
- Finalize deliverables format, topic, approach, and team/work structure

Name	Date
Subcommittee Kick-Off meeting	July 22, 2022
Subcommittee Meeting	Aug 24, 2022
September 2022 NGAC Meeting and subcommittee status report • Sessions on Datum Modernization and Geodesy	Sept 7-8, 2022
Subcommittee Meeting	November 3, 2022
December 2022 NGAC Meeting and subcommittee status report • NGAC resolutions on Geodesy crisis • NGAC summary on datum modernization • Session on IGIF	Dec 6-7, 2022
Subcommittee Meeting(s)	TBD
Subcommittee paper with findings and recommendations	TBD

Objectives

1. Identify and examine issues critical to U.S. geospatial competitiveness, excellence and innovation.
2. Host NGAC sessions and workshops to explore key issues and engage with thought leaders.
3. Document NGAC findings with case studies on the topic
4. Develop recommendations for the U.S. geospatial community to enhance key geospatial capabilities and initiatives.

Datum Modernization Discussion Summary

- Dr. Dru Smith provided six steps to ensure a successful transition to the modernized NSRS:
  - Stay Calm: Many ways of doing business will remain the same and many new tools will finally support long established practices
  - Familiarize Yourself: The blueprint documents and presentation library are available online along with the NGS webinar series and NSRS Modernization newsletter.
  - Ask Agencies and Companies That You Rely on About Their Transition Plans: Contact your representatives at ESRI, Trimble, Leica, etc.
  - Organize Your Historic Data Archives: Help yourself so that when a new frame or datum is released, you can easily establish what areas may need to be adjusted versus re-surveyed.
  - Check Out NGS Tools as They Are Released: Updates and Alpha versions will be rolled out by the end of CY2022; reviewing these tools upon release will benefit both users and the creators.
  - Embrace the Future: The planet is round, dynamic, and complicated; let us lean into the future of data gathering.

Datum Modernization NGAC Summary (1)

- The NSRS used today is based on pre-space-age geodetic technology
  - The existing NAD 83 coordinates may change by 2–4 meters and the orthometric heights may change by up to 2 meters (or more) when compared to the measurements using the new datums (https://geodesy.noaa.gov/datums/newdatums/WhatToExpect.shtml
- All current global and regional reference frames rely on the availability of the *International Terrestrial Reference Frame* (ITRF).
  - While the ITRF is a global reference system, it allows regional and national reference frames to easily connect to IRF using the signals from Global Satellite Navigation Systems (GNSS).
  - Most regional and global reference frames are already aligned or related to ITRF.
- The NSRS modernization effort embraces the pre-eminence of the ITRF and provides “USA specific” frames only as an after-the-fact derivative product.
- This will lead the way toward a purely ITRF-based surveying and mapping reference system for US.

Datum Modernization NGAC Summary (2)

How to prepare for the modernized NSRS

- Due to the current delays with the modernized NSRS, agencies have time to prepare for the new NSRS
- Many systems that currently use the NAD 83 coordinates can continue to operate, but agencies and software companies should be prepared to support the new NSRS
- Educating relevant departments in the various federal agencies about the upcoming NSRS changes should be of high priority
- All the agencies should be preparing their transition plans to adopt the new NSRS
- Agencies should also be talking to their software vendors about the vendors plans to support the new NSRS
- NGS will provide tools and documentation required to make this transition to go smoothly, so agencies should engage with NGS while preparing their transition plans

Geodesy Discussion Summary

- The geodesy crisis is a multi-layer, multi-faceted issue involving academia, industry, and government agencies.
  - For academia, there are almost no geodesy programs in higher education throughout the US.
  - The decline in people trained in geodesy for decades, and the retirement of existing geodesists have threatened many disciplines and business that directly or indirectly rely on geodesy
  - The number of geodesists at federal government agencies like NGA is approaching zero.

- Dr. Michael Bevis and his colleagues outlined several corrective actions that the US should take in order to reverse this ever-growing crisis.
  - Research and development funding for basic and applied geodesy should be increased; this can start with increased funding to academia.
  - The US should ensure that multiple research groups are funded to perform parallel research and development in all mission-critical areas.
  - Training throughout the geodesy field should be expanded by removing the barrier to entry in education, ensuring in-house training for existing employees of geospatial agencies, and training researchers at the Ph.D. level in geodetic research groups.

NGAC Resolution on Geodesy

"The decline of geodetic academic programs in the United States and the resulting shortage of practicing geodesists threatens our international technological competitiveness in Earth and space science, affecting our economic health and security. The National Geospatial Advisory Committee (NGAC) supports the findings, which include challenges, threats, and opportunities, outlined in the "Geodesy Crisis" white paper* authored by Dr. Michael Bevis et al. and discussed with NGAC members.

The NGAC strongly recommends that these serious national challenges be addressed immediately through an ambitious program of educational support, research funding, and government agency action including:

- Address the challenges and opportunities for augmenting geodesy capabilities in support of the National Spatial Reference System and within relevant Federal Geographic Data Committee (FGDC) agencies.
- Promote understanding within FGDC agencies and across the geospatial community about how geodesy expertise advances socio-economic, environmental, ecological, intelligence, and military programs to advance national security and economic growth.
- Augment budgets to sponsor academic training and research work in geodesy and allied geospatial fields (the NGAC commends the National Geospatial-Intelligence Agency for providing leadership and financial commitment to this effort).
- Act expediently."

(Adopted by the NGAC on December 7, 2022)

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* The white paper titled "America's loss of capacity and international competitiveness in geodesy, the economic and military implications, and some modes of corrective action" can be found at https://aagsmo.org/wp-content/uploads/2022/02/TheGeodesyCrisis_Final.pdf

Approach & Timeline

- Phase 1 (12 months) – Develop and prioritize study topics
- Phase 2 (24 months) – deeper dive into the study topics, organize workshops and gather feedback from various stakeholders including national and international experts; initial recommendations by the end of 2023
- Phase 3 (years 2 and 3) – progress update
- Phase 4 (end of year 3) – Final recommendations

Deliverables

- Framing document for each study topic with overview and background
- Workshops and sessions with thought leaders from the proposed topics of study
- Summaries of discussions from workshops
- Case studies to showcase challenges and suggestions
- Report on emerging trends, opportunities, and challenges for each topic, initial findings by end of 2023
- Action plans and recommendations to FGDC agencies

Discussion Questions

1. Proposed Next topic of discussion is AI/ML in next NGAC meeting

2. Creation of National Center for Geosciences

3. Any other topics of interest from the NGAC?